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North America 2018

Deploying Windows Apps with Kubernetes, Draft and Helm





I am **Jessica Deen**

I am here because I love technology and community.

I focus heavily on Linux, OSS, DevOps and Containers.

I love Disney and CrossFit / Fitness.

No relation to James Dean.

You can find me online [@jldeen](#) on Twitter, Instagram, and GitHub.



I am **Patrick Lang**

SIG-Windows Co-Chair @ Microsoft

I am here because I want to make technology work for you.

I focus on containers and virtualization, Windows and Linux

I love music, travel, coffee, brewing and cooking.

You can find me online @patricklang on GitHub & Keybase.io

Disclaimer



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Before we begin, there are a few things we want to highlight:

- This session was intentionally created to get you thinking and show you where we are with building Kubernetes on windows
- This tutorial session has limited space due to the hands-on lab machines we have prepared
- The lab VMs we do have on hold are using a PREVIEW service (Azure Labs) and we are putting it to the test today! What could go wrong?
- All resources are available on GitHub so you can try your own deployment, your own lab, on your own time
 - The video of the tutorial will be recorded and will be available online after the event

Level set



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“The secret of change is to focus all of your energy, not on fighting the old, but on building the new.”

- Socrates

Building Kubernetes on Windows



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2016

Containers in Windows Server technical preview

SIG-Windows formed

- Apprenda, CloudBase, TicketMaster, Docker, Huawei

Kubernetes 1.5 alpha using Windows Server 2016



2017-2018

Building out core capabilities

- Net & storage improved in K8s 1.6-1.10, Windows Server 1709/1803

- CNI Plugins: OVN+OVS, Calico, Flannel, cni/plugins

Distro previews announced

- Azure, Docker, Rancher, RedHat, Huawei



2018/2019

Windows Server 2019 LTSC

Product previews coming

- AKS
- Docker
- Huawei Cloud
- RedHat

Focus on stability, testing, docs for v1.13+. Proposing `stable` in v1.14

Building Mixed Clusters

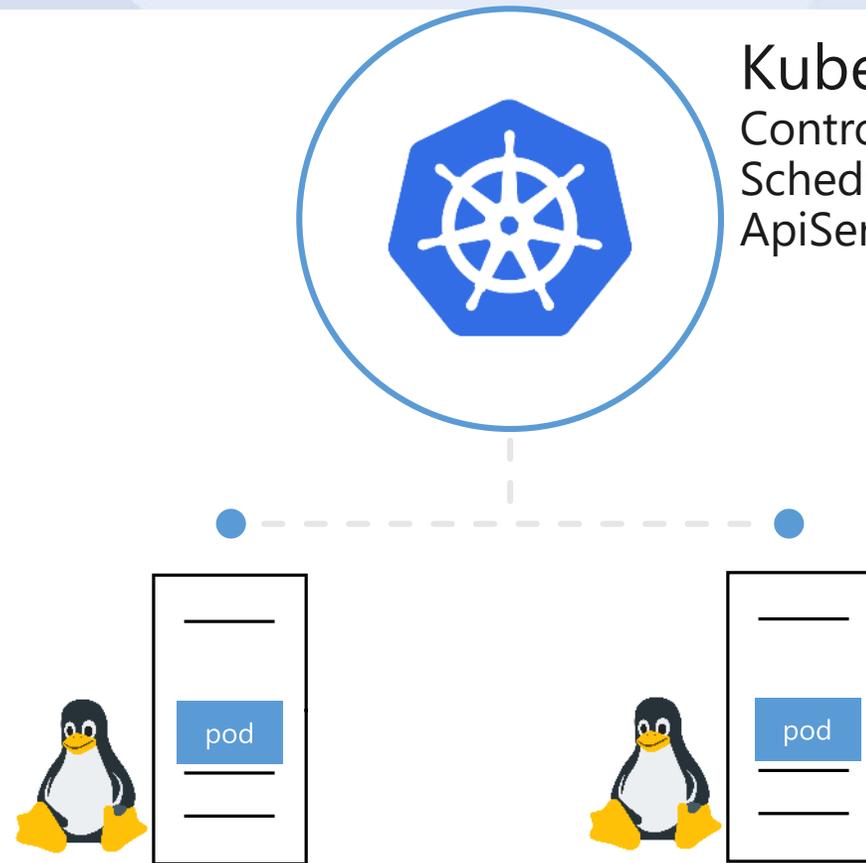


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Kubernetes Master Nodes

Controller-Manager

Scheduler

ApiServer

Worker Nodes

Kubelet

Kube-proxy

CRI/CNI/Storage Plugins

Building Mixed Clusters

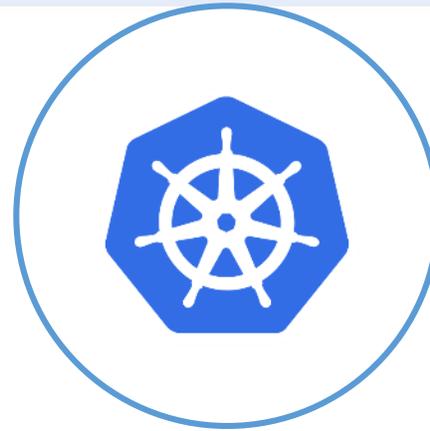


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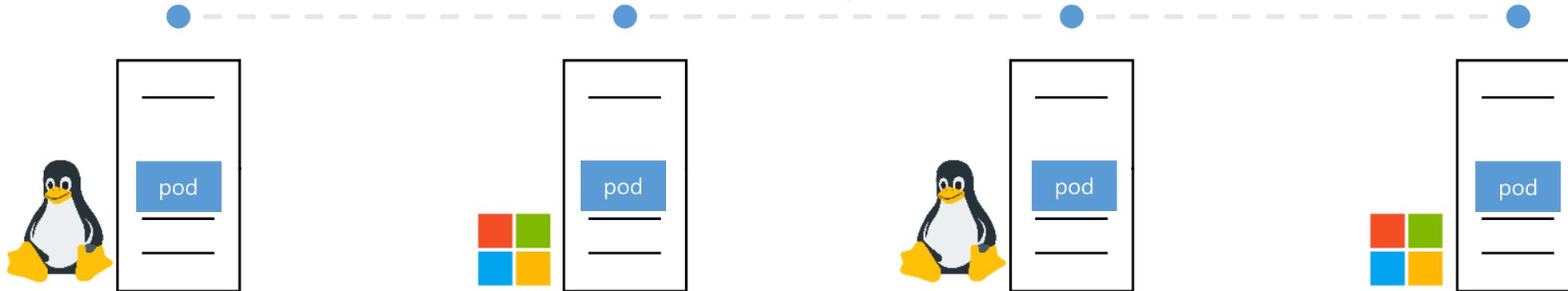
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Kubernetes Master Nodes

Controller-Manager
Scheduler
ApiServer



Worker Nodes

Kubelet
Kube-proxy
CRI/CNI/Storage Plugins

Kubernetes as usual...



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```
kubectl get node
```

NAME	STATUS	ROLES	AGE	VERSION	OS-IMAGE
4512k8s010	Ready	agent	7d5h	v1.13.0-rc.1	Windows Server Datacenter
4512k8s011	Ready	agent	7d5h	v1.13.0-rc.1	Windows Server Datacenter
k8s-linuxpool1-45120536-0	Ready	agent	7d5h	v1.13.0-alpha.2	Ubuntu 16.04.5 LTS
k8s-linuxpool1-45120536-1	Ready	agent	7d5h	v1.13.0-alpha.2	Ubuntu 16.04.5 LTS
k8s-master-45120536-0	Ready	master	7d5h	v1.13.0-alpha.2	Ubuntu 16.04.5 LTS

Kubernetes as usual...



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```
kubectl get pod -n kube-system
```

NAME	READY	STATUS	RESTARTS	AGE
coredns-68865449bf-5kw84	1/1	Running	0	7d6h
heapster-8cf68f757-pqhc9	2/2	Running	0	7d6h
kube-apiserver-k8s-master-45120536-0	1/1	Running	0	7d6h
kube-controller-manager-k8s-master-45120536-0	1/1	Running	7	7d6h
kube-proxy-fhmrx	1/1	Running	0	7d6h
kube-scheduler-k8s-master-45120536-0	1/1	Running	8	7d6h
kubernetes-dashboard-5bfcdcd6c8-s2wrb	1/1	Running	0	7d6h
metrics-server-69b44566d5-j9zqc	1/1	Running	0	7d6h
tiller-deploy-74b7fb5bb9-qx7l7	1/1	Running	0	7d6h

Apps across multiple nodes



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```
kubectl get pod
```

NAME	READY	STATUS	NODE
aspnetapp-aspnetapp-756594bd94-kvdh6	1/1	Running	4512k8s010
eshoponweb-eshoponweb-547775c567-zpt7h	1/1	Running	4512k8s011
nginx-ingress-controller-74db494f97-2jg5d	1/1	Running	k8s-linuxpool1-45120536-1
nginx-ingress-default-backend-558944d794-j...	1/1	Running	k8s-linuxpool1-45120536-1
quoting-cricket-fabrikamfiber-mssql-instan...	1/1	Running	k8s-linuxpool1-45120536-1
quoting-cricket-fabrikamfiber-web-87d89b58...	1/1	Running	4512k8s011

Hands-On Logistics



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- 1) Get your Lab VM <https://github.com/PatrickLang/kkna2018lab>
 - You'll need a RDP client, links are on the site
 - If we scroll through the list of VMs, the email or name you enter could end up on the screen briefly
- 2) In the VM, browse to <https://github.com/PatrickLang/KubernetesForWindowsTutorial>

Hands On – Deploying a Windows App

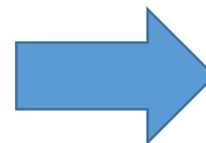


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The screenshot shows a web browser window displaying a support dashboard. The dashboard has a header with the 'FABRIKAM FIBER Support' logo and navigation links for 'Dashboard', 'Tickets', 'Customers', 'Employees', and 'Reports'. A 'Create New' button is visible in the top right. The main content area is divided into a 'Profile' section on the left and a 'Dashboard' section on the right. The profile section shows a user profile for 'Drew Robbins' with 5 alerts and 3 tickets. The dashboard section contains a table of tickets.

Ref	Status	Escalation	Title	Assigned To	Time Open
A014101	Assigned	Level 1	Modem keeps resetting itself	Drew Robbins	1 Days
A014102	Closed	Level 2	Internet Upload speed slow from...	Brian Keller	Closed
A014103	Open	Level 1	FabFiber is the worst EVER!!!	None	55 Minutes
A014104	Assigned	Level 1	changing channel by it self	Drew Robbins	1 Days
A014105	Assigned	Level 2	Viewing Recorded Programs	Brian Keller	1 Days
A014106	Assigned	Level 1	Issues with service	Jonathan Carter	55 Minutes
A014107	Assigned	Level 1	Poor Picture Quality	Jonathan Carter	1 Days
A014108	Assigned	Level 2	Channels gone!	Brian Keller	1 Days
A014109	Assigned	Level 1	Not getting all my channels	Brian Keller	55 Minutes

It's the same right?



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Same API = management tools

- Kubectl
- Helm

Manage Linux from Windows, Windows from Linux,
Linux from Windows running Linux tools with WSL,

...

Same processes

- kubelet, dockerd/containerd, cni

Same supporting container infrastructure

- Container registries (including Docker Hub)

Things to Consider



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Where the container runs

- Need a Windows Server node = Use NodeSelector

If you're adding Windows and don't already have nodeSelector on Linux deployments

- Option 1: Add a taint to Windows nodes, toleration to Windows deployments
- Option 2: Update your Helm Charts and YAML files

Resource Consumption

- Need higher limits (300Mb min) - need Windows background services per container

Kernel/User compatibility

- Windows kernel major version should match (for now)
- Build on Windows Server 2019 = must run on Windows Server 2019
 - Likewise for other versions
- Hyper-V isolation [alpha] can run older containers on a newer node

Windows version decoder ring



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Windows Server 2016	10.0.14393.*
Windows Server version 1709	10.0.16299.*
Windows Server version 1803	10.0.17134.*
Windows Server 2019 / 1809	10.0.17763.*

Specific patch versions and downloads are linked from:

<https://support.microsoft.com/en-us/help/4464619>

- Be sure to click on the right major version in the left pane

Taking it to production

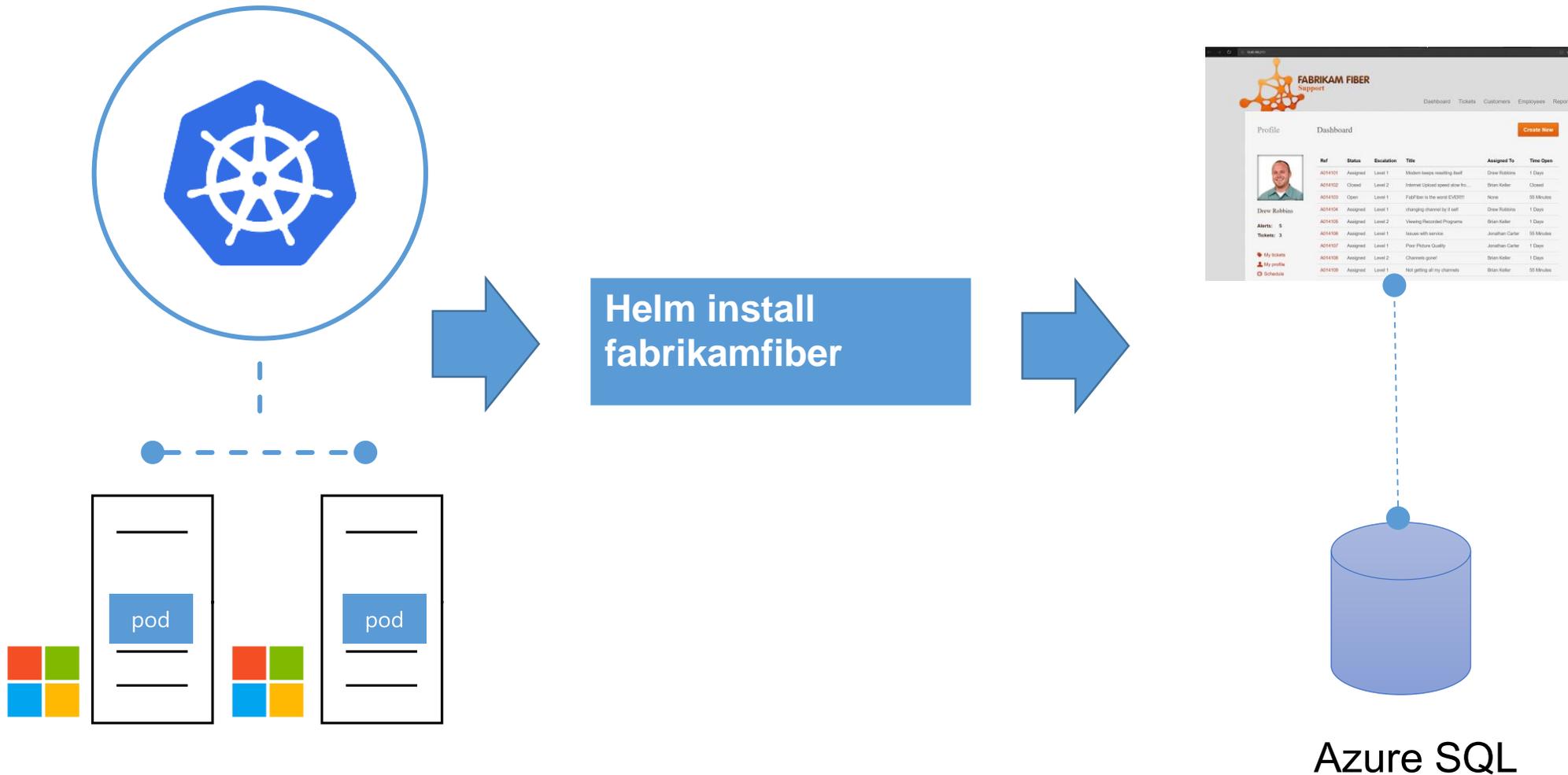


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Taking it to production

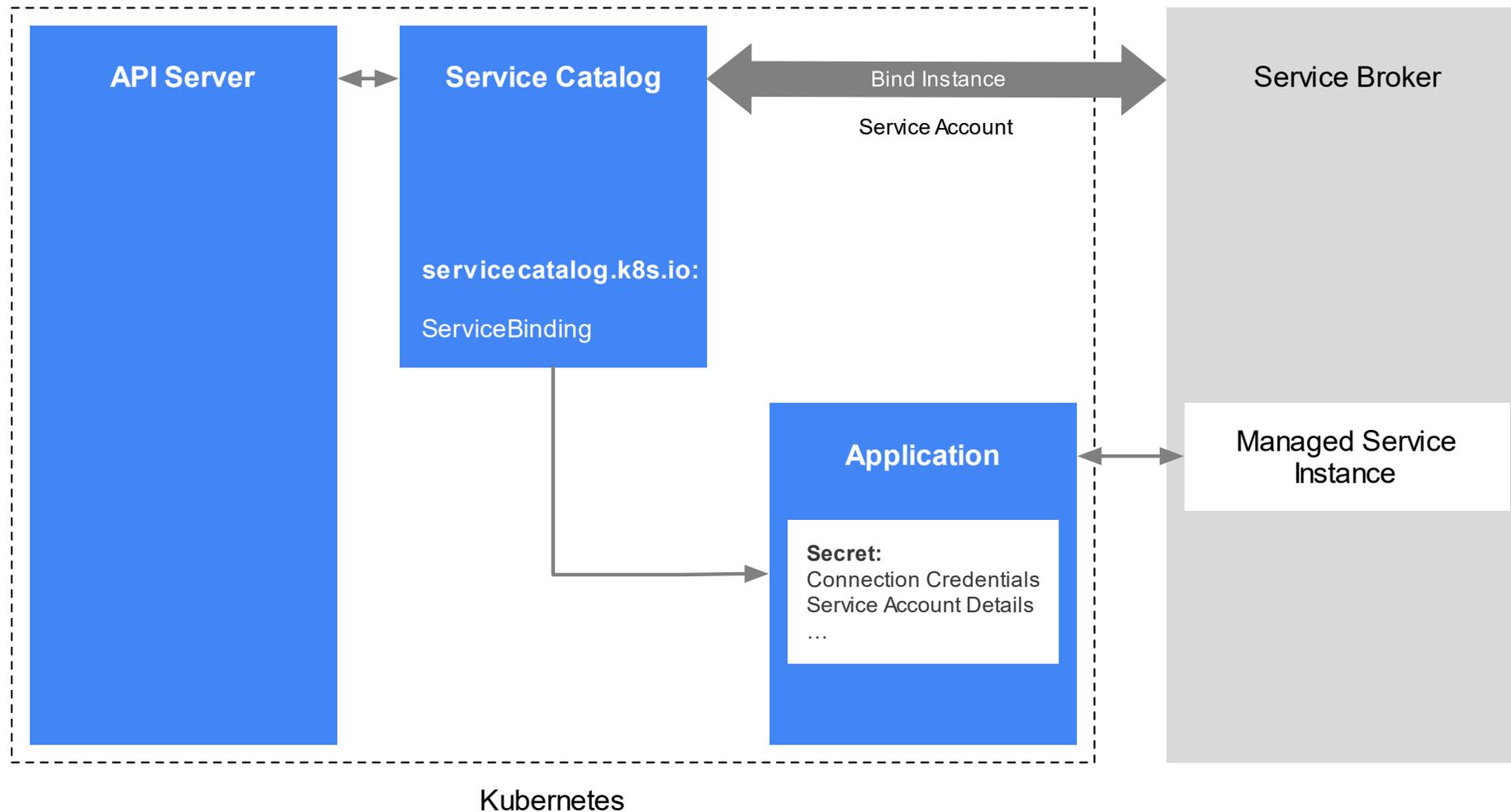


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Release Automation

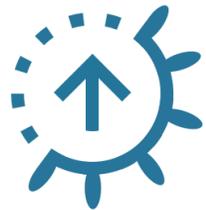


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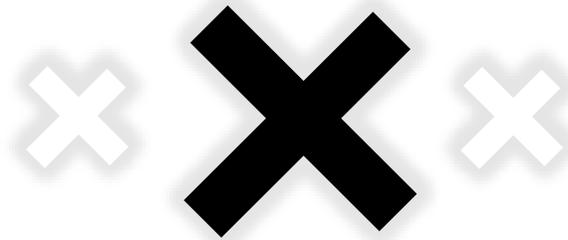


DRAFT

Streamlined Kubernetes development.

Simplifies Helm.

Release Automation



Open Source



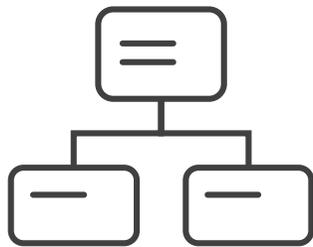
The defacto Kubernetes package manager.

Powered by a template engine.

Kubernetes is hard.
Kubernetes is complex.
Let's simplify.



The best way to find, share, and use software built for **Kubernetes**



Manage complexity

Charts can describe complex apps; provide repeatable app installs, and serve as a single point of authority



Easy updates

Take the pain out of updates with in-place upgrades and custom hooks



Simple sharing

Charts are easy to version, share, and host on public or private servers



Rollbacks

Use `helm rollback` to roll back to an older version of a release with ease

Release Automation



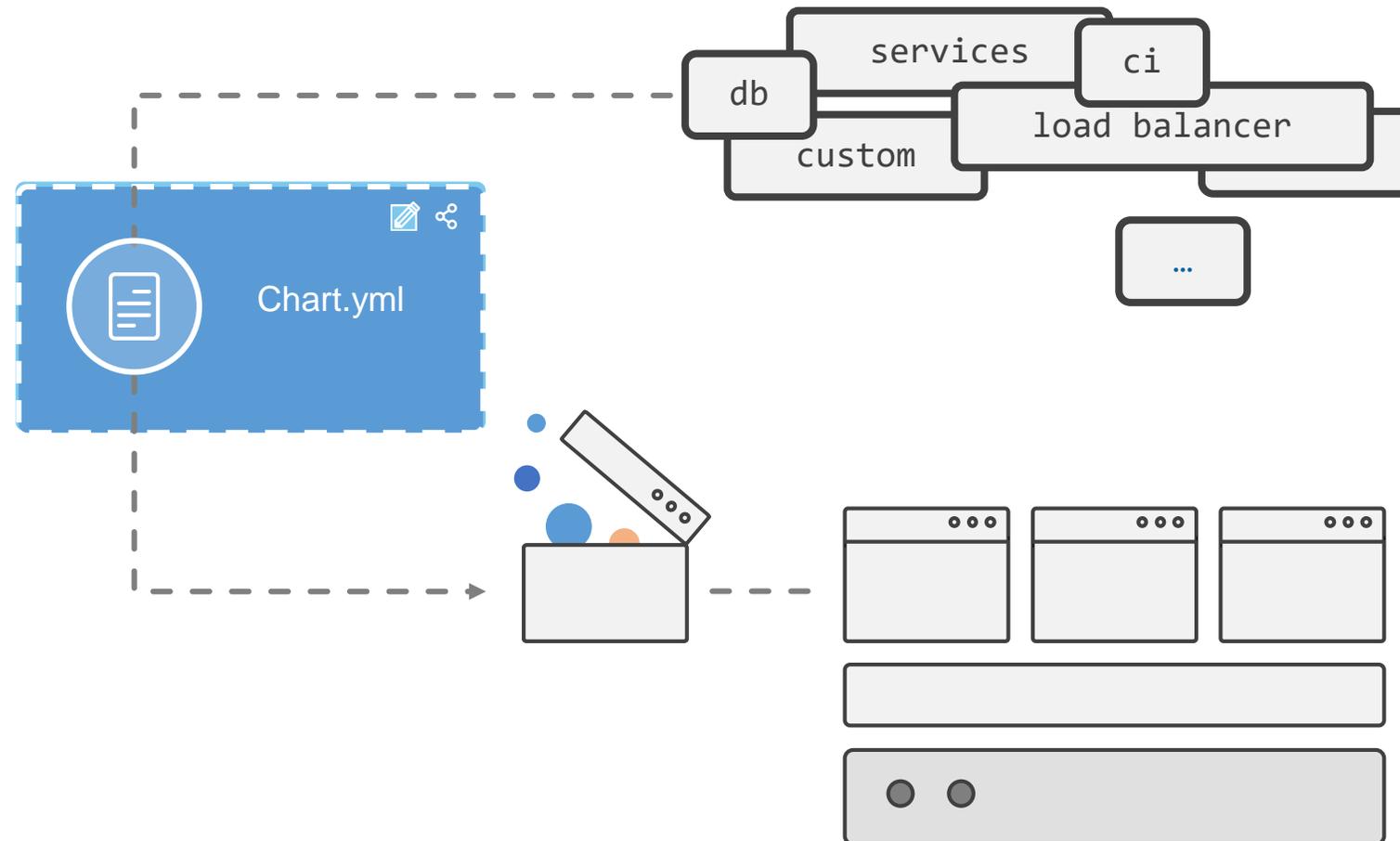
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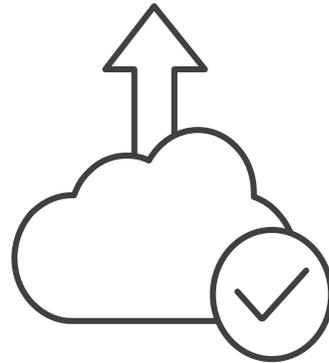
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Helm charts help you define, install, and **simplify**

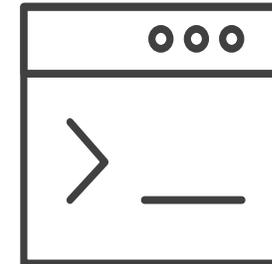


Simple app development and deployment into any Kubernetes cluster



Simplified development

Using two simple commands, developers can now begin hacking on container-based applications without writing Dockerfiles or even installing Kubernetes themselves



Language support

Draft detects which language your app is written in, and then uses packs to generate a Dockerfile and Helm Chart with the best practices for that language

Hands On – Building a Windows App



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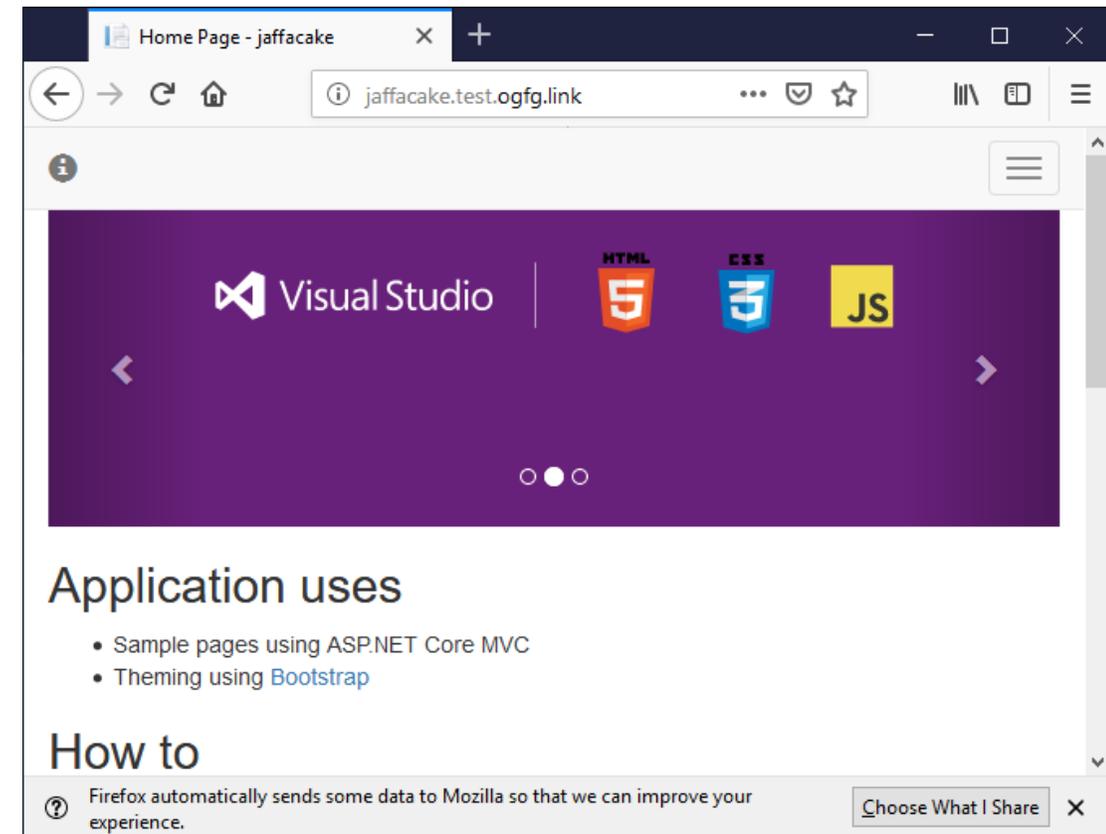
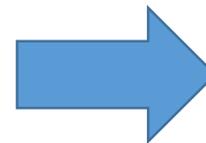


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```
dotnet new mvc
draft create -p CSharpWindowsNetCore
draft up
```

```
Draft Up Started: 'jaffacake': 01CYFB2WD0CNMPZV0EW6DSF2JF
jaffacake: Building Docker Image: SUCCESS (105.0876s)
jaffacake: Pushing Docker Image: SUCCESS (8.2328s)
jaffacake: Releasing Application: SUCCESS (35.8252s)
Inspect the logs with `draft logs
01CYFB2WD0CNMPZV0EW6DSF2JF`
```



Applying DevOps to Lift and Shift



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.ASP Net



NuGet
restore



Solution
Build



Image
Build



Package



Deploy



Applying DevOps to Modern



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.Net Core



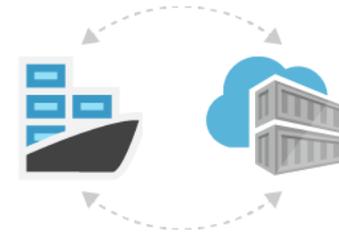
Build



Package



Deploy



You will want to take a picture

(of this slide)



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aka.ms/winkubecon

SEARCH



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